

REMARKS / DISCUSSION OF ISSUES

Claims 1-20 were the subject of an Appeal to the Board of Patent Appeals and Interferences, which was filed on June 7, 2006. By this filing, Applicants constructively withdraw that Appeal in favor of the present RCE.

Claims 1 and 12 are the independent claims. As no amendment is made to the claims, a listing is not required under Rule 121, and is not provided.

Rejections under 35 U.S.C. § 103

Claims 1-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fathimulla, et al.* (U.S. Patent 5,338,394) in view of *Pearton, et al.* (Applied Physics Letters 60(7) (1992)). For at least the reasons set forth below, Applicants respectfully submit that a *prima facie* case of obviousness has not been established as to the rejected claims.

At the outset, Applicants rely at least on the following standard of law as it relates to obviousness. Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. While the sequence of these questions might be reordered in any particular case, the factors continue to define the inquiry that controls. If a court, or patent examiner, conducts this analysis and concludes the claimed subject matter was obvious, the claim is invalid or unpatentable under § 103. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727; 82 U.S.P.Q.2D 1385 (2007), citing, in part *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

The Court in *KSR* continued: “A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning. See *Graham*, 383 U.S., at 36, 86 S. Ct. 684, 15 L. Ed. 2d 545 (warning

against a "temptation to read into the prior art the teachings of the invention in issue" and instructing courts to "guard against slipping into the use of hindsight" (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F.2d 406, 412 (CA6 1964)))." Moreover, if there is no suggestion to combine the teachings of the applied art, other than the use of Applicants' invention as a template for its own reconstruction, a rejection for obviousness is improper. *Ex parte Crawford, et al.* Appeal 20062429, May 30, 2007.

A reference may be said to **teach away** when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994); *see KSR*, 127 S. Ct. at 1739-40 (explaining that when the prior art **teaches away** from a combination, that combination is more likely to be nonobvious).

i. Fathimulla, et al. teaches away

Claim 1 is drawn to a method for etching III-V semiconductor material and features:

"...introducing a first gas chosen from HBr, HI and IBr into said reactive ion etching reactor; introducing a second gas of CH₄ into said reactive ion etching reactor; introducing a third gas of H₂; and exposing a portion of said III-V semiconductor material to be etched to a mixture comprising said first, said second and said third gas."

As such, among other aspects, the method of claim 1 includes: introducing a first gas into an RIE reactor, and introducing methane into the reactor and introducing H₂. Claim 12 is drawn to a method for etching a III-V semiconductor substrate and includes the noted features.

The Examiner's Answer to the Appeal Brief appears to restate verbatim the Examiner's position of the earlier Final Office Action. To wit,

Fathimulla describes a method for etching an III-V material comprising: placing the III-V substrate into a RIE chamber and etching the substrate with a gas mixture of HBr and CH₄ (claims 1-4). Unlike claimed invention, Fathimulla doesn't describe the gas mixture having H₂. Pearton teaches a method for etching III-V material wherein the gas mixture includes H₂ (pages 839; left column). It would have been obvious for one skilled in the art at the time of the invention to modify Fathimulla in light of Pearton by including H₂ in the gas mixture because Pearton teaches addition of the H₂ to the gas mixture provide a much smoother surfaces and Fathimulla teaches that other combinations of gas composition can be used to give a smooth vertical feature (col. 3, line 65-68).

A review of portions of *Fathimulla, et al.* relied upon in the rejection does reveal the use of HBr as an alternative to SiCl₄ in a mixture of methane; or the use of HBr as an alternative to SiCl₄ in a mixture of H₂. Again, and at the risk of redundancy, claims 1 and 20 teach the use of introducing HBr, methane and H₂. By contrast, one of ordinary skill in the art would be would be led by the disclosure of *Fathimulla, et al.* in a direction divergent from the path that was taken by the Applicant. Namely, not to introduce both methane and H₂ into the RIE reactor, but rather to introduce either methane or H₂. Accordingly, the applied reference to *Fathimulla, et al.* teaches away and, therefore, does not qualify as a reference. As such, and for at least the reasons set forth above, because *Fathimulla, et al.* teaches away, reliance thereon renders the rejection for obviousness improper. Withdrawal of this rejection is earnestly solicited.

ii. Pearton, et al. teaches away

The Examiner concedes that the reference to *Fathimulla, et al.* fails to disclose the use of H₂ in the gas mixture. (As noted previously, the reference to *Fathimulla, et al.* discloses the use of HBr and methane, or HBr and H₂. Thus, the mixture of HBr, methane and H₂ is not disclosed in the reference; and for reasons set forth above, teaches away

from this combination.) The Examiner then turns to *Pearton, et al.* in an attempt to cure this defect. However, *Pearton, et al.* discourages the use of methane/ H₂ mixtures.

Notably, the reference states:

“The major limitation with the use of CH₄/H₂ discharges is the slow etch rates... [and] Several attempts to enhance the CH₄/H₂ etch rates by addition of Cl₂ (Ref. 9) and PCl₃ (Ref. 10) have been reported, but relatively high self-biases were needed to achieve practical etch rates and careful seasoning of the reactor necessary for reproducible results.”

The reference then touts the use of an HI/H₂ discharge as having much faster etch rates than CH₄/ H₂. Accordingly, Applicants respectfully submit that one of ordinary skill in the art would be discouraged from seeking to introduce methane and H₂ in the RIE reactor as set forth in claims 1 and 20. Therefore, the applied reference to *Pearton, et al.* teaches away and cannot serve as a reference in a rejection of the claims under present consideration. (Applicants refer to page 838, left column of the reference to *Pearton, et al.* for support for their position.)

iii. Rejection uses impermissible hindsight

Applicants respectfully submit that impermissible hindsight has been used in an attempt to cobble a rejection from piece-parts garnered selectively from the applied art. To this end, claims 1 and 12 include the introduction of a first gas, and methane and H₂ to a RIE chamber. The primary reference discloses the use of either methane or H₂ with HBr, which is one possible ‘first gas.’ The Examiner then selectively selects two of the gases, HBr and methane, and recognizing that the third gas is missing turns to the secondary reference for the teaching of the missing third gas, H₂. However, as noted above, not only does the secondary reference not encourage the combining of H₂ with methane, as the Examiner attempts to do, but also, the reference to *Pearton, et al.* discourages this combination in favor of another combination.

Respectfully, Applicants assert that the one and only way that one skilled in the art would select the combinations as the Examiner suggests is if the artisan had

Applicants claims as templates for their reconstruction. Otherwise, the artisan would be led in a different direction by *Fathimulla, et al.* (i.e., to use either methane or H₂) than claims 1 and 12; and would be discouraged by *Pearton, et al.* from combining methane and H₂.

For at least the reasons set forth in subsections i., ii., and iii., Applicants respectfully submit that the rejection of claims 1 and 12 under 35 U.S.C. § 103 is improper and that claims 1 and 12 are patentable over the applied art. Moreover, and for at least the same reasons, the rejections of claims 2-11 and 13-20, which depend from claims 1 and 12, respectively, are also improper and these claims are patentable for at least the same reasons.

Conclusion

In view the foregoing, applicant(s) respectfully request(s) that the Examiner withdraw the objection(s) and/or rejection(s) of record, allow all the pending claims, and find the application in condition for allowance.

If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted on behalf of:

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